

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Wireless Telecommunications Bureau)	
Seeks Comment on Report on Technical)	WT Docket No. 02-46
and Operational Wireless E9-1-1 Issues)	
)	

To: The Commission

**COMMENTS OF RCC CONSULTANTS
IN RESPONSE TO THE HATFIELD REPORT**

RCC Consultants, Inc. ("RCC") submits these comments in response to the above-referenced Public Notice concerning the Report on Technical and Operational Issues Impacting the Provision of Wireless Enhanced 9-1-1 by Dale N. Hatfield filed on October 15, 2002 ("Hatfield Report" or "Report").¹ RCC commends Mr. Hatfield for his ability to identify and analyze the myriad of issues surrounding wireless E9-1-1 services and for the excellent report that he has prepared for the Commission. RCC generally supports the conclusions reached in the Report and offers these comments on three of the issues affecting wireless E9-1-1 implementation that merit special attention.

RCC is a leading public safety communications consulting firm with a twenty year history in the industry. RCC provides services to wireless carriers, local exchange carriers, public safety agencies, third party providers, and location

determination equipment vendors throughout the United States and in international markets. In conjunction with the National Emergency Number Association (“NENA”), RCC has developed a program to test and certify installations of wireless E9-1-1 location determination equipment and techniques. In the course of this work RCC has encountered many of the issues in wireless E9-1-1 implementation that have been identified in the Hatfield Report.

I. EFFECTIVE WIRELESS E9-1-1 IMPLEMENTATION REQUIRES A NATIONAL 9-1-1 PROGRAM OFFICE, AN FCC ADVISORY COMMITTEE, AND COORDINATION WITH STATE AND LOCAL AUTHORITIES

The Hatfield Report observes that currently there is no multi-disciplinary forum for the coordination of stakeholders in the development, deployment, and operation of wireless 9-1-1 systems, nor is there a technical advisory resource available to the Commission that can provide advice on 9-1-1 related issues.² To fill this gap the Report recommends that a “National 9-1-1 Program Office” be established within the proposed Department of Homeland Security that would coordinate with local and state public safety “first responders” and other stakeholders.³ Additionally, the Report recommends that the Commission establish an “Advisory Committee” within the Commission to address the technical framework for the further development and evolution of E9-1-1 systems and services including technical standards.⁴ The Report also urges the creation of organizations at the state, regional, and local levels of government to coordinate the rollout of wireless E9-1-1 services.⁵

¹ See *Wireless Telecommunications Bureau Seeks Comment on Report on Technical and Operational Wireless E9-1-1 Issues*, Public Notice, WT Docket No. 02-46, DA 02-2666 (rel. Oct. 16, 2002).

² See Hatfield Report at 16 and 22.

³ See *id.* at 17.

⁴ See *id.* at 23.

⁵ See *id.* at 25.

As pointed out in the Hatfield Report, the nation's wireless E9-1-1 system is "a large and technically complex collection of hardware, software, and human elements that allow the delivery of emergency messages, call back number and location information for calls made from wireless subscriber devices like cellular telephones."⁶ Numerous stakeholders participate in the delivery of E9-1-1 services from a variety of private and public entities including ILECs, CLECs, IXC, wireless carriers, PBX owners, private telephone network owners, public safety answering points, regulators, customer premises equipment manufacturers, telecommunications switch and transmission equipment manufacturers, computer aided dispatch software developers, and the general public. Additionally, as also pointed out in the Report, the existing landline E9-1-1 infrastructure, while generally reliable, is seriously antiquated and needs to be updated to take advantage of the advances in digital technology and other general advances made in the nation's telecommunications networks.⁷ Clearly there is need for guidance and coordination of the numerous stakeholders to ensure the integrity of the E9-1-1 systems in the United States.

RCC agrees with the recommendations made in the Report and supports the establishment of a "National 9-1-1 Program Office" within the proposed Department of Homeland Security. RCC believes that this office will have the benefits of cross-jurisdictional responsibility, an established funding mechanism, and high visibility within the government.

RCC also supports the recommended establishment of a "9-1-1 Advisory Committee" within the Commission. RCC believes that the Commission should sponsor this forum for the purpose of exploring and receiving advice on standards, services, technologies, practices, and interfaces that may require regulation or clarification of existing policies or regulations.

⁶ *Id.* at 22.

The Report recommends establishment of “9-1-1 Coordinators” in every State.⁸ It is RCC’s opinion that this recommendation is in the spirit of the Wireless Communications and Public Safety Act of 1999 (S.800),⁹ which directed the Commission to encourage and assist states in developing and implementing coordinated state emergency communications upgrade plans. RCC believes that offices at state and local levels will assure the Commission and the nation that a coordinated effort will be made to overcome any obstacles in the deployment of wireless E9-1-1 services throughout the country.

II. END-TO-END TESTING OF WIRELESS E9-1-1 SYSTEMS IS REQUIRED

RCC also agrees with the Hatfield Report’s recognition of the need for end-to-end testing of wireless E9-1-1 systems. RCC strongly supports the suggestions made in the Report that the Commission should urge stakeholders to develop industry-wide procedures for testing and certifying wireless E9-1-1 to ensure that these systems, on a real-time basis, meet the accuracy and timing requirements specified in the Commission’s rules.¹⁰

RCC believes that the public interest requires more than the mere assertion that the location technology has been implemented and provides an accurate position. There is a general public expectation that wireless 9-1-1 calls will be routed, located, and handled with the same accuracy and high percentage of availability as landline 9-1-1 calls. Without rigorous testing and independent verification of performance, this expectation may not be fulfilled. In the worst case, lives may be lost and public confidence in 9-1-1 will be eroded.

⁷ See *id.* at 14 and 20.

⁸ See *id.* at 25-26.

⁹ Pub. L. No. 106-81, 113 Stat. 1286 (1999).

¹⁰ See Hatfield Report at 12-13, 34-35.

In order to provide and to ensure a high level of wireless 9-1-1 service consistent with that provided by landline 9-1-1 systems, it will be necessary to verify that each wireless solution implemented performs at the same high standards. This verification requires qualitative measurement of the effectiveness of each wireless carrier's deployment. Further, the performance of all equipment must be monitored and maintained in order to provide the highest level of reliability possible in the wireless environment, as is the practice in the landline telephony industry. RCC believes that the wireless 9-1-1 system must provide the same overall availability, reliability, and consistency that, from experience, the public anticipates and expects from landline 9-1-1 services.

In addition, it is important to consider the ubiquity and uniformity that is generally expected by citizens in assuring that their wireless phones will provide the expected access to emergency services in each wireless service area. Not only have Americans come to expect a high level of service for both wireless and landline 9-1-1, but they also expect these services to be consistent, seamless, and transparent from one service area to another.

It is RCC's opinion that testing should be based on a methodology that addresses the essential components of the wireless 9-1-1 call process – coverage, proper routing of emergency calls, acceptable timing, call completion, and delivery of accurate location data to the public safety answering point ("PSAP"). Thus, testing must be end-to-end to verify that each step of the process is functioning properly. Further, testing should be performed through the life cycle of the system (development, deployment, and operations) throughout the nation. Testing methods should be consistent with those described in FCC OET Bulletin No. 71¹¹ and should be uniformly applied throughout the industry to prevent the deployment of a "patchwork" of inconsistent services that do not provide the

technical integrity that emergency service providers require to accomplish their primary mission.

As a partner with NENA in the development of its wireless 9-1-1 testing and certification program, RCC has spent a great deal of time and resources on these issues. Based on this experience, RCC has recognized the need for such testing and certification. All of the issues enumerated in OET Bulletin No. 71 were reviewed, and detailed engineering tests were developed to verify independently that the carrier's chosen Phase II position determining system would meet the Commission rules through end-to-end testing.

Specifically, the testing and certification program involves the random generation of locations within a known geographic area such as a county or a PSAP service area to be tested. The number of samples is of a sufficient size so as to minimize the chances of not sampling one jurisdiction over another. Test calls are initiated from subscriber units under test in the randomly-generated location. The position, determined by a higher accuracy differential GPS receiver, is used as a reference point to compute the location distance between the subscriber unit under test, its position determined by the associated positioning determining equipment, and the reference test GPS receiver. The resulting error distances are placed in order in accordance with OET Bulletin No. 71's recommendations for order statistics, and the 67th and 95th percentile distances are determined with a 90 percent confidence level.

These distances are then compared to the tolerance limits set by the Commission to assess whether compliance is met or not met. Separately, the error distances are further broken down by standard land-use/land-cover (clutter) categories to identify how the error distances compare, for example, between

¹¹ See *Guidelines for Testing and Verifying the Accuracy of Wireless E9-1-1 Location Systems*, OET Bulletin No. 71 (Apr. 12, 2000).

urban areas, typically characterized by medium to tall size buildings, and suburban to rural areas for the benefit of both the PSAPs and the wireless carriers. This added information can be used as a tool to help carriers plan for future upgrades by way of possibly adding additional position determining equipment, improving the reverse link margin, and plan where to deploy new equipment, if required.

Without such independent testing, neither the carriers, nor the PSAPs, and more importantly, the general public will ever know if the selected 9-1-1 position determining systems do in fact meet the requirements of the Commission's rules. Thus, RCC enthusiastically supports independent testing and certification of both pre-deployment and deployed position determining systems.

III. WIRELESS 9-1-1 CALLS MUST BE ROUTED BASED ON THE CALLER'S LOCATION IN ORDER TO PROTECT LIVES

Current FCC rules require routing of wireless 9-1-1 calls by cell site and sector (if sectorized) for both Phase I and II installations.¹² RCC recommends that the Commission revisit this rule, as RCC's experience indicates that it is not unusual for the correct location of an emergency call to be delivered to the wrong PSAP due to overreach of cell sector coverage across political jurisdiction boundaries. Although RCC generally supports the opinion expressed in the Hatfield Report that now may not be the time to make further rule modifications,¹³ this particular change has life-saving implications. Further, such a rule change will support the Commission's long-standing goal of making wireless 9-1-1 as compatible with landline E9-1-1 as possible. In RCC's opinion, this rule needs to be modified so that wireless 9-1-1 calls route on the location of the caller, as is the case with wireline E9-1-1.

¹² See 47 C.F.R. § 20.18.

¹³ See Hatfield Report at 45-46.

Use of cell sectors for 9-1-1 call routing is imprecise and introduces delays and errors when calls are sent to the wrong PSAP. Such misrouting can occur for several reasons. First, the coverage from a single cell can serve multiple jurisdictions. Second, if the closest cell is busy, a call may be assigned to a more distant cell site. Third, a distant cell site may provide the greatest signal strength at a location several cell sites away due to terrain or clutter factors. Routing by cell sector is comparable to routing landline calls on the basis of the location of the telephone company central office, a practice used in early basic 9-1-1 systems and long ago deemed inappropriate for E9-1-1 calls after mishandled calls contributed to the loss of lives.

New Jersey, home of RCC's corporate headquarters, is the most densely populated state in the United States. It is bordered on two sides by densely populated metropolitan areas in New York and Pennsylvania. Philadelphia is directly across the Delaware River and New York City is directly across the Hudson River from New Jersey. The rivers that separate these highly populated areas do not attenuate cellular signals. On a regular basis, emergency 9-1-1 cell calls placed in New York City and Philadelphia are misrouted to New Jersey and vice-versa.

In January 1997, only six months after the Commission issued the Notice of Proposed Rule Making in CC Docket 94-102,¹⁴ the State of New Jersey coordinated a live E9-1-1 Phase II trial which demonstrated over a wide area that technology was available to locate wireless 9-1-1 calls and that these calls could be properly routed to the correct PSAP within the 30 seconds mandated by the Commission's rules. The testing area involved a four county region and three county PSAPs.

¹⁴ See *Revision of the Commission's Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems*, Report and Order and Further Notice of Proposed Rulemaking, 11 FCC Rcd 18676 (1996).

During the first 100 days of the test, participants in the trial placed over 81,700 test calls, and 3,505 actual live wireless 9-1-1 calls were received and routed to the proper PSAPs. RCC believes that routing on the basis of the location of the caller is the optimal solution and is achievable with existing technology.

The Hatfield Report states that position information is used for two purposes – to route the call initially to the proper PSAP and to provide the caller's location to that PSAP. Routing on cell sites and sectors will not assure that the call is routed to the proper PSAP. This can occur only if the call is routed on the caller's location, as is the practice for landline E9-1-1.

The problem of misrouted emergency calls is exacerbated by the fact that E9-1-1 tandems in the wireline telephone network are generally not interconnected. When a PSAP receives a misrouted 9-1-1 call, the call is typically transferred to the proper PSAP on a POTS line or dedicated tie line. Because the tandem switches are not interconnected, the dispatcher at the receiving PSAP does not receive automatic number identification (ANI) or automatic location information (ALI) or other functions provided by the E9-1-1 system. If wireless 9-1-1 calls are ever going to be even remotely consistent with landline E9-1-1, as contemplated by the Commission and emergency service providers throughout the nation, then wireless 9-1-1 calls must be routed based on the caller's location. Otherwise, the benefits of the location information will not be consistently available to PSAPs due to misrouting, which results in delays and mistakes that threaten both life and property.

IV. CONCLUSION

RCC supports the recommendations made in the Hatfield Report and encourages the Commission to take a leadership role in certain areas of wireless E9-1-1 implementation in order to accelerate the deployment of reliable and safe

wireless 9-1-1 services throughout the nation. The Commission's initiatives should include creating and supporting advisory committees for the coordination and standardization of wireless E9-1-1 at Federal, state, and local levels.

RCC also supports the Report's recognition of the need for testing and certification programs of Phase II Wireless E9-1-1 position determination and routing systems as contemplated by OET Bulletin No. 71. RCC believes that such programs serve the public interest by ensuring that Wireless 9-1-1 calls are handled promptly and accurately by the proper PSAP.

RCC further suggests that a fundamental change be made in the method by which wireless 9-1-1 calls are routed from the present practice of cell sector selection to routing on the actual location of the caller. This change is necessary to reduce the probability of delays in the dispatch of life-saving services by public safety answering points. Finally, RCC believes that wireless E9-1-1 calls must be offered the same high percentage of availability and accuracy of routing as is provided by landline E9-1-1 services throughout the nation.

Respectfully submitted,

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/s/

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